

Restoring the Riparian Forest Red River and Sheyenne River Riparian Sites

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Natural riparian corridors are the most diverse, dynamic, and complex biophysical habitats on the terrestrial portion of Earth. (Naiman, 1993). It is alarming to realize that 80 percent of the riparian corridor area in North America has disappeared since settlement. Riparian forests serve a critical role in nutrient cycling, hydrology, and ecology in the watershed. See the side-bar for functions of riparian forest buffers.

This article focuses on the lessons we learned in restoring or reestablishing two riparian forest buffers. The two sites are located on different rivers, illustrate different impacts, and present opportunities for different treatments. They are similar, as are all riparian forests, in their interaction with the rivers and streams and in the water quality functions they perform.

The following paragraphs describe the sites and the experiences we've had with these sites.

Site 1:

The first site, owned by Rob Loe, is a wooded site on the Sheyenne River southwest of McVille. As the site of a wintering yard for Loe's cow-calf operation, this riparian forest exhibited very low natural regeneration, commonly associated with livestock use. The loss of American Elm in the past decade accentuated the poor age class diversity. A 1995 forest inventory, prior to implementation of the project, showed understory tree density at zero stems per acre.

Riparian Buffer Functions

Filter: Sediment/materials adsorbed on to sediment particles are filtered out by dense matrix of stiff stems.

Transformer: Denitrification occurs efficiently under saturated conditions and adequate residence times.

Nutrient sink: Nutrients assimilated into plant materials are sequestered for an extended period of time.

Energy source: Woody material from the riparian zone provides carbon for detritivores, the base of the food chain. In small streams as much as 99 percent is derived from outside the stream.

Diversity: The riparian zone, as the interface between land and water, is rich in species diversity, and provides a travel corridor for birds and mammals.

Flood damage reduction: Riparian buffers reduce flood damage by temporarily storing surface runoff.



Sheyenne River site where livestock were excluded from within 200 feet of the river. Note handplants (in background) in Tubex.

Management Strategy: The native timber was still in place, albeit in poor condition. Therefore, the strategy employed was to improve age and species diversity of the woodland through livestock exclusion and native tree plantings. Americorp volunteers planted 200 bur oak and basswood seedlings, with mulch mats and Tubex (3-foot plastic tubes to protect trees). Additional bare root stock was scalp-planted. In this case, the livestock exclusion worked with the landowner's objectives, so the fence was moved back 200 feet from the streambank.

Results: Floods are frequent events on this land; therefore, the reader should evaluate these early results in light of the extreme flood events of 1996 and 1997. Floods are a disturbance and, as such, offer the opportunity for natural regeneration to occur. In the area excluding livestock use, the number of seedling stems increased from zero to over 1,000 stems per acre. This number is still low, compared to forests in good or excellent condition, but certainly indicates a positive trend.

On the downside, the high flood tangled many of the Tubex and filled the tubes with mud. Only 25 percent of the trees survived the conditions. The Tubex are probably not an advantage in frequently flooded areas or in areas where low maintenance is preferred. Survival of the scalped-in planting was lower yet due to weed competition (Brumbaugh, 1998).

Site 2: The Red River site, owned by David and Shirley Raney, is located six miles north of Drayton on the Red River of the North. Most of the native riparian woodland had been cleared for agricultural use. The soils adjacent to the river are Cashel clay series, with Wahpeton soils upland. The landowner's objective was to improve wildlife habitat in the area. Frequent flooding makes it difficult and expensive to farm the Cashel clay land. In David's words, "The land really belongs to the river, and it just makes sense to give it back."



L to R: John Schmidt, Linda Kingery, Jim Walla and David Raney evaluate Raney site planting during the September 22, 1998 tour

Strategy: The planting plan for this site called for block plantings of seven hybrid poplar varieties. The original planting in 1995 included two blocks of aspen, which did not tolerate the flooding well. These blocks were replanted with hybrid poplars. The north boundary of the field has a row of 19

varieties of hybrid poplar, provided by North Dakota State University, as part of a field windbreak study.

An additional planting in 1997 included three rows of hybrid poplar, one row of mixed hardwoods, and three rows of shrubs. A grass filter strip is planned for the western edge of the buffer. The combination of trees, shrubs, and grass optimize the function of the riparian buffer.

Results: The response of the various hybrid poplar varieties is mixed. After the third season, Robusta appears to be the leader, although it tends to suffer winter die-back (see photo this page). Two other varieties doing well are 14272 and 14273. The fast growth of these varieties makes them strong performers in terms of nutrient assimilation.

Weed competition is a limiting factor for tree establishment. Controlling weeds is a critical practice for establishing slower-growing species. It may be beneficial to use the fast-growing hybrids to create a shaded, weed-free environment to start shade-tolerant species.

It seems that the saying holds true for riparian corridors, “Sometimes you don’t know what you got ‘til it’s gone.” If the native vegetation is present, moderate management is in order. If the native vegetation has been lost, re-establishing the woody vegetation is a long-term process.

“The sensitivity and value of riparian forests should make a basic guiding principle obvious: Treat riparian forests with moderation. With this principle in mind, one can consider various management practices and use those with the least impact whenever managing riparian forests. For example, favor small-scale management, long rotations, and a natural assemblage of tree species (Malcom Hunter).”

References:

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